DOCUMENTS EXPEDITING PROJECT

86th Congress
1st Session

COMMITTEE PRINT

COMPARISON OF UNITED STATES AND RUSSIAN ACTIVITIES IN THE MINERAL RESOURCES FIELD

MEMORANDUM OF THE CHAIRMAN

TO THE

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS

UNITED STATES SENATE

TRANSMITTING A

REPORT FROM THE DEPARTMENT OF THE INTERIOR ON UNITED STATES AND RUSSIAN EXPLORATION, RESEARCH, SELF-SUFFICIENCY, TRAINING OF SCIENTISTS, AND OTHER ACTIVITIES IN THE MINERALS FIELD

NOVEMBER 1959

Printed for the use of the Committee on Interior and Insular Affairs

UNITED STATES
GOVERNMENT PRINTING OFFICE
48576 WASHINGTON : 1959

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MEMORANDUM OF THE CHAIRMAN

U.S. SENATE,
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D.C., November 15, 1959.

To the Members of the Interior and Insular Affairs Committee:

Because of the competitive race between the United States and the Soviet Union in economic fields, I submitted eight questions to the Interior Department intended to develop the facts and the Department's views on comparative minerals activities in the two nations.

The Department's replies, submitted by Acting Secretary Elmer Bennett on September 11, 1959, contain information and views which I believe will be of interest to committee members and the public, and of importance in our consideration of minerals problems in the coming session of Congress.

The Department's report indicates, among other things, that Russia leads the United States in exploration for minerals, is now using roughly twice as many geologists as Government, private industries, and college institutions combined in the United States, and is training 4 times as many geologists in universities—12,000 compared to our 3,000. The Russians apparently lead us in translation and dissemination of technical materials and in fundamental research in the mineral field.

The Department feels the United States "will continue to increase its store of scientific and technical knowledge at a rate commensurate with national objectives and needs." But the report reiterates the Department's desire for increased research appropriations and redirects attention to recommendations of the President's Cabinet Committee on Minerals Policy urging the Nation to accelerate topographical and geological mapping, geological research, development of geophysical and geochemical theories and techniques, to undertake direct exploration for critically short materials, and to strengthen our collection and dissemination of facts on minerals resources. The Committee further recommended expansion of programs to develop latent resources, new mineral raw materials, improved utilization of available materials, and coordination of Federal activities in the minerals field.

My letter of inquiry and the Department's reply are submitted herewith.

JAMES E. MURRAY, *Chairman.*

COMMUNICATION OF SENATOR MURRAY TO THE DEPARTMENT OF THE INTERIOR REQUESTING VIEWS ON EIGHT POINTS

U.S. SENATE,
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, May 12, 1959.

Hon. FRED A. SEATON,
Secretary of the Interior, Department of Interior,
Washington, D.C.

DEAR MR. SECRETARY: I note with considerable interest that the Bureau of Mines is making a special effort to obtain and interpret information on mineral developments in the Communist countries. Apparently expansion in production proceeds at a more rapid pace in the U.S.S.R. than in the United States. This alarming trend should be a matter of great concern to all responsible for maintaining the mineral strength of our country. Are we doing all we can to protect our domestic mining industry in the face of the Communist threat? With this in mind I shall be pleased to have your views on the following points:

1. How does the overall effort in seeking and evaluating mineral resources in the U.S.S.R. compare with that in the United States?
2. Do the Bureau of Mines and the Geological Survey have access to all pertinent resource data developed by private industry? If not, what can be done to make such data available to Government?
3. How does the volume of fundamental scientific research on mineral technology and new methods of discovering mineral deposits compare in the two countries?
4. How does the U.S. program for gathering, translating, and distributing technical information on minerals and metallurgy from all parts of the world compare with that of the U.S.S.R.?
5. How do the experts in the Department of the Interior appraise relatively the efficiency of mineral and metallurgical technology in the United States and the U.S.S.R.?
6. What is the policy of the Soviet Government toward self-sufficiency in minerals? How does its policy compare with that of the United States?
7. Are the Bureau of Mines and the Geological Survey obtaining all of the funds they need for maximum effort in finding and developing domestic resources and appraising foreign developments?
8. How do the incentives and rewards to mineral specialists and geologists of the U.S. Government compare with those of the U.S.S.R.?

Sincerely yours,

JAMES E. MURRAY,
Chairman,
Minerals, Materials, and Fuels Subcommittee.

RESPONSE OF THE DEPARTMENT OF THE INTERIOR TO THE REQUEST FOR VIEWS

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., September 11, 1959.

Hon. JAMES E. MURRAY,
U.S. Senate,
Washington, D.C.

DEAR SENATOR MURRAY: In accordance with our letter of August 26, we are pleased to forward answers to the questions asked by you concerning comparisons between mineral resource development in the U.S.S.R. and the United States. These answers, prefaced by remarks of general character, appear in the following statement.

The questions submitted by you have been carefully studied within the Department, and all information available to the Bureau of Mines and to the Geological Survey has been considered, in an effort to develop meaningful responses to these questions.

Sincerely yours,

ELMER BENNETT,
Acting Secretary of the Interior.

MINERAL DEVELOPMENTS IN THE U.S.S.R. AND THE UNITED STATES

Comments on Eight Questions Asked in Senator James E. Murray's Letter of May 12, 1959, to Secretary of the Interior Fred A. Seaton

GENERAL STATEMENT

The Department of the Interior wishes to make a number of general observations before discussing these questions.

Economic development within the Soviet Union cannot be compared with that in the United States without regard to the extreme differences in the social and political philosophies and objectives of the two countries. The Russian economic system functions behind an iron curtain, with total world domination and subjugation as eventual aims. The free enterprise system of the United States is designed to promote peaceful development within an atmosphere of free world harmony and cooperation.

The development and use of minerals and metals and the mineral fuels are not regarded as ends in themselves within the United States. From our point of view, the employment of these materials has meaning only as it contributes to human security and welfare. This cannot be said for the U.S.S.R.

Soviet economic policy and, consequently, its mineral policy, is tied directly to its avowed policy of world domination and the elimination of non-Communist free societies. While U.S. minerals policy necessarily is designed to maintain a secure defense posture, through mobilization programs authorized by the Stockpiling Act and the Defense Production Act, our national policies also have as a primary objective the development of mineral resources to support an expanding economy and the betterment of human welfare. It may be noted in passing that largely as a result of these divergent patterns, Americans have available for purchase many more times the goods and services available to the Soviet consumer.

Soviet emphasis on efforts to strengthen the industrial and military posture of the U.S.S.R. in the international political arena obviously is a matter of great concern to the United States. Significant also are the rapid gains in the U.S.S.R. mineral production and technology as revealed in the accompanying comments on the eight points raised in Senator Murray's letter. Soviet advances in the mineral field clearly indicate the necessity for constant vigilance to preserve and strengthen wherever possible a sound minerals economy within the United States. It is our view that in doing so we should continue to place reliance upon the free competitive enterprise system which has provided the United States with the freest and most affluent industrial society in the world. The major role in our mineral production program we feel should remain with the private enterprise sector of our economy.

Total minerals production of the two economies is one measure which may be used for purposes of comparison. The U.S.S.R. accounted for one-sixth (16 percent), by value, of the 1957 world's total mineral output, according to estimates prepared by the Division of Foreign Activities of the Bureau of Mines. The United States, with a substantially smaller population, produced from domestic sources about 30 percent of the total. Thus, the United States continues to hold a commanding lead in total mineral production.

The Department also wishes to call attention to the fact that it is difficult to draw comparisons to cover all mineral resource development. The situation varies widely within the many commodity fields. The wide differences among the many segments of our own minerals economy make this obvious.

The Soviet mineral industry is founded on abundant mineral resources. As a consequence, its growing economy is becoming increasingly self-sufficient in mineral supply. The United States, on the other hand, has in recent years imported increasingly larger quantities of many mineral raw materials to meet our rapidly expanding requirements. While U.S. production has shown substantial increases for some minerals, production generally has not kept pace with the growth of our manufacturing economy. On the other hand, American capital has aggressively sought mineral development opportunities abroad. As a consequence, mineral raw materials are drawn from many foreign sources considered to be reliable.

The Communists have declared war on capitalism and constantly maintain a war economy. Surrounded by not too dependable satellites, it would appear that the aggressively pursued policy of the U.S.S.R. is self-sufficiency at any cost. Many mineral ventures of the Soviet Union are uneconomic by Western standards and could not survive in free competitive world markets. Nevertheless, with complete nationalization and low-wage labor, certain marginal mineral production in the U.S.S.R. not only satisfies domestic needs (which are purposely kept low by restricting consumer goods output), but in some cases provides a surplus for export as well.

In the short span of 40 years the U.S.S.R. has grown from an agrarian nation into next to the largest industrial producer in the world, being second only to the United States. In order to effect this change of basic economy the U.S.S.R. put major emphasis on development for expansion of mineral production and other industries.

The unprecedented growth over the last century in social and economic betterment for all Americans along with the great industrial expansion of the United States could not have taken place without adequate mineral raw materials. In some instances we have greatly increased domestic minerals production; in others, where domestic sources have been unable to meet requirements, we have been able to draw from friendly foreign sources.

Private capital, under our economic system, is free to seek investment opportunities throughout the free world. Investment abroad, insofar as Russia is concerned, is a part of a Government program to spread its political aims. Foreign trade is a monopoly of the Soviet Government and is part of an arsenal for economic warfare.

The Department of the Interior has repeatedly placed emphasis on the need for an expanded program of minerals exploration and development. While traditionally this is a function of private industry

within our free enterprise society, the Federal Government should continue to assist in this effort by carrying out those related activities, such as topographic and geologic mapping and research and development work, which cannot or would not normally be undertaken by private industry.

It is a proper function of our Federal Government to maintain an economic environment which will be conducive to aggressive search for and development of new areas of mineralization by private industry.

The following comments on the eight questions raised in Senator Murray's letter of May 12, 1959, illustrate the major features of differences between the U.S.S.R. and the United States in the minerals area.

1. How does the overall effort in seeking and evaluating mineral resources in the U.S.S.R. compare with that in the United States?

No quantitative comparison between the overall efforts being made by the U.S.S.R. and United States to discover and evaluate mineral resources can be made. Whereas all work of this type is done under governmental auspices in the U.S.S.R., the major effort in this country is made by private enterprise, and there is no consolidated record of the effort expended by the United States as a whole. Although it might be possible to obtain figures by examining annual reports of mining companies, tabulating expenditures by the State and Federal agencies, and estimating the endeavors of private citizens, the Department does not believe that the result would be particularly meaningful.

Soviet sources indicate that the expenditure for exploration alone in the U.S.S.R. is about 1 percent of their gross national product. Proportionally, this effort undoubtedly exceeds that of the United States, but this comparison must be tempered by knowledge of the relative needs of the two countries. To illustrate, the Soviet is believed to have some 5,000 scientists engaged in exploring for and developing coal resources, whereas only a small number are so engaged in the United States. However, through past efforts and because of the nature of our deposits, the United States is known to have reserves of coal that will last for centuries. Thus our major effort today is directed toward new and more efficient methods of utilizing coal.

A second major point of difference between the effort of the U.S.S.R. and the United States in this field is geographic. The U.S.S.R. is expending most if not all its effort in the mineral resource field within the confines of the Soviet bloc, and probably most within the Soviet Union. On the contrary, much American private capital is being invested abroad, part of it in mineral exploration. Exploration abroad in some instances yields considerably more than equal effort expended in the United States, which reflects the comparatively untapped state of the mineral resources of lesser developed countries. Such activity also contributes materially to raising the standard of living in these countries.

With the foregoing qualifications stated, the Soviet effort, taken at face value, would seem to be greater than our own. Manpowerwise, the U.S.S.R. employed 35,000 to 40,000 geologists in 1958, roughly

twice as many as Government, private industry, and educational institutions did in the United States. Furthermore, the Soviet universities are turning out some 12,000 geologists a year, as compared to about 3,000 in the United States. As the state directs all activities in the Soviet Union, including numbers and disciplines of science graduates, it seems obvious that the U.S.S.R. intends to increase further the total effort devoted to this field.

In attempting to evaluate the reasons for and long-term effect of this apparently intensive drive on the part of the U.S.S.R. to discover and evaluate its mineral resources, several factors need consideration. The minerals industry in the Soviet Union was at a virtual standstill in the 1920's. Everything was lacking except a desire to "catch up" to the advanced nations. By contrast, U.S. industry had access to ample supplies of most raw materials from domestic and imported sources, and knew where to get more when the demand arose. Lacking foreign exchange, suspicious of foreign trade, and dedicated to a policy of self-sufficiency regardless of the privations it imposed on the citizenry, the Soviet Union engaged in a tremendous effort to increase the strength of its mineral position. Because the land area of the U.S.S.R. is vast and its mineral resources virtually untapped, this effort apparently has accomplished considerable within a relatively short period of time.

Because commercial mineral deposits are increasingly more difficult to find within the United States by locating and following surface outcrops, we need to make greater progress in developing new and better methods of locating subsurface structures. Among the greatest problems faced by our domestic mining industry are the depletion of easily accessible high-grade reserves, together with the substantially increased costs that go with the mining of low-grade ores, and the difficulties encountered in the search for and mining of more deeply buried ore deposits. It is reasonable to expect that private industry in this country will continue to assume the risks in solving these problems, as it has traditionally.

2. Do the Bureau of Mines and the Geological Survey have access to all pertinent resource data developed by private industry? If not, what can be done to make such data available to Government?

Although the Bureau of Mines and the Geological Survey do not have access to all data developed by private industry, frequently at considerable cost to the companies concerned, those data pertinent to the current programs of these agencies are usually available on a basis of mutual interest. Experience has shown that when compelling public interests require revelation of company data to the Government, private industry cooperates on a voluntary basis. There seems to be no reason to change the present policy in this regard.

3. How does the volume of fundamental scientific research on mineral technology and new methods of discovering mineral deposits compare in the two countries?

This question is difficult if not impossible to answer definitively for much the same reasons as was question 1. Basically, the problem

stems from the difference between the centralized Soviet system and our free enterprise method in which fundamental scientific research is divided between Government agencies, universities, and private institutions.

The U.S.S.R. is known to maintain a number of well-equipped and well-staffed specialized institutes devoted to various aspects of basic research in the minerals field. The rapidly increasing volume of publications in Russian gives ample evidence that these organizations are active.

The Department of the Interior has repeatedly called attention to the need for a program of exploration, as well as to the need for research to find new and better exploration methods and techniques. The Federal Government provides primary assistance through fundamental research in the earth sciences and, as a result, work programs of the Bureau of Mines and the Geological Survey are designed to furnish this type of assistance.

Although it is difficult to document on a quantitative basis, information available to the Department suggests that the fundamental scientific effort being expended in the mineral field by the U.S.S.R. exceeds that in the United States, particularly within more recent years.

4. How does the U.S. program for gathering, translating, and distributing technical information on minerals and metallurgy from all parts of the world compare with that of the U.S.S.R.?

The United States has a substantially smaller program than the U.S.S.R. for translating foreign technical information in the field of minerals. During its early formative stages the Soviet Union depended almost entirely on foreign technology. The U.S.S.R. did not join any international patent or copyright agreement and consequently "borrowed" freely from the free world. During 40 years of Communist rule the Russians have developed a large and apparently effective organization for making available promptly abstracts and translations of most significant world literature in the minerals field. The U.S.S.R. Government now has a large central translating unit with over a thousand full-time technically trained translators who collect scientific and technical literature in all fields for translation and distribution to Soviet investigators.

Until recently most new significant information on mineral technology was available to American scientists in English, the Romance languages, or German. No real need for familiarity with literature in the non-Western languages was generally recognized, and there was no organized effort to gather, translate, and distribute it. However, considerable progress has been made in expanding the facilities for English translations of scientific and technical literature published in Slavic and oriental languages.

The problem is more difficult for us because, whereas Russian scientists commonly are familiar with English and at least one other Western tongue, relatively few American scientists have any knowledge of Russian.

5. How do the experts in the Department of the Interior appraise relatively the efficiency of mineral and metallurgical technology in the United States and the U.S.S.R.?

Mineral and metallurgical technology in the United States is, on the whole, far advanced over that in the Soviet Union. The U.S.S.R. may have reached prominence in a few fields, as in the use of top pressure to increase the yield of her blast furnaces, and perhaps in high-temperature applications of the so-called superalloys.

Much of the recent Soviet progress is undoubtedly due to the great emphasis placed on learning Western technology and applying it to Russian mineral problems. However, Soviet scientists and engineers are also contributing new knowledge in this field.

There is every reason to believe, however, that the United States, under the incentives provided by the free enterprise system, and with encouragement by the Federal Government, will continue to increase its store of scientific and technical knowledge at a rate commensurate with national objectives and needs.

Indicative of the importance Russia attaches to technical education, the attached chart [1] taken from Pravda, November 2, 1958 (based on data believed to be essentially correct), shows that from 1950 to 1957 engineering graduates in the U.S.S.R. increased from 36,000 to 83,000. During the same period the number of graduates in the United States declined from 53,000 to 31,000. The number of graduates in all mineral fields is said to be five times greater in the U.S.S.R. than in the United States. The conclusion is inescapable that Russia has a well-organized program for rapidly increasing its supply of scientific and technological personnel, and this, in turn, undoubtedly will result in increased efficiency of mineral and metallurgical technology in the U.S.S.R.

6. What is the policy of the Soviet Government toward self-sufficiency in minerals? How does its policy compare with that of the United States?

Attainment of self-sufficiency in minerals is an unwritten but positive principle of Soviet mineral policy, and the goal of self-sufficiency is sought more or less regardless of costs. With respect to most commodities, dependence on satellite sources of supply is not basic in Soviet mineral planning. On the contrary, U.S.S.R. expansion programs frequently include the provision of materials for export to the satellite countries.[2]

The policy of the United States has not regarded total self-sufficiency in all of the mineral raw materials required by our economy as a necessary objective.

Dependence upon foreign sources for certain of our mineral requirements, in part or in whole, is necessary because many minerals are not found in sufficient quantity in the United States to supply our needs. This fact was one of the reasons for instituting the stockpile program, as a security measure. Based upon our present knowledge of reserves, total national self-sufficiency in all minerals and metals could not economically and readily be achieved except at excessive and prohibitive cost. For many mineral commodities it could be achieved in varying degrees—all directly related to cost. For still

[1] See chart on p. 9.
[2] See chart on p. 10.

other minerals, we have such a plentiful domestic supply as to be the principal world source. Self-sufficiency in minerals is directly related to quantity and grade of ore reserves. In a competitive economy in the free enterprise system, self-sufficiency is also related to costs of production.

There is need for continuing search for new minable domestic ore reserves and for aggressive research programs to make better use of what we have and to find substitutes for what we have not. Concentration of effort in these areas over the long term will achieve the best results and will provide the greatest overall benefits to our national economic well-being.

We do not believe it is in the national interest to pursue the course of self-sufficiency beyond prudent and reasonable economic limits.

There are occasions when it is sound policy to provide special assistance to the minerals-producing industries in order to meet particular situations. The Department of the Interior has, from time to time, presented and supported measures calling for special treatment for certain of the minerals industries. However, when such special assistance is provided, it is on a basis which assures benefits to the whole economy commensurate with the costs involved, and it is provided in a manner that is consistent with our overall national policy.

7. Are the Bureau of Mines and the Geological Survey obtaining all of the funds they need for maximum effort in finding and developing domestic resources and appraising foreign developments?

The Bureau of Mines and the Geological Survey are expanding their efforts along the lines indicated. The Department of the Interior's long-range minerals program, presented on June 4, 1957, emphasized the need for intensifying research programs in the minerals area. Some increases in appropriations for these two agencies have been authorized in recent years.

Some specific recommendations were made in the report of the President's Cabinet Committee on Minerals Policy:

6. That the Department of the Interior, the Federal agency with major responsibilities in this field (of mineral resources), accelerate those activities which must precede or supplement private exploration such as topographic and geologic mapping, geologic research, and the development of geochemical and geophysical theories and techniques.

7. That the Department of the Interior expand direct exploration activities aimed at the discovery of new mineralized areas or critically short materials essential to security, but that work in this field be confined to that which provides data as to the probable location and general potential of mineral deposits, and, further, that this type of search be undertaken by the Federal Government only when it clearly is in the national interest and when it is reasonably certain that the work will not be done by private industry.

9. That the Secretary of the Interior take such steps as may be necessary to strengthen and coordinate the collection and dissemination of facts concerning the Nation's mineral resources and factors pertaining to their production and utilization.

10. That the Department of the Interior intensify its program of mineral and metal research aimed at the development of latent resources, new mineral raw materials and improved utilization of existing raw materials, and coordinate its mineral and metal research with that of other Federal agencies and, as practicable, with research by industry.

The Department continues to believe that the Federal Government through these activities can play an important role in mineral resource development as it has in the past, and that Congress will appropriate funds for these purposes to the extent required in the national interest.

8. How do the incentives and rewards to mineral specialists and geologists of the U.S. Government compare with those of the U.S.S.R.?

The standard of living enjoyed within the United States is the highest the world has ever known. The economic and social advantages of Americans generally are so vastly superior to those of people within the U.S.S.R. that the comparison called for in the above question is almost impossible to make.

In general, scientists, engineers, and educators appear to command great prestige in the U.S.S.R. Within its peculiar social-economic structure, the Soviet Union also provides substantial incentives and rewards for its mineral specialists. Salaries are said to range from 5 to 10 times those of unskilled laborers. It might be said that the U.S.S.R. has established a society of technicians, which exists as a class within a supposedly "classless" society. The combination of prestige plus financial reward is unquestionably a significant factor in the rapid expansion of trained personnel in the Soviet Union.

The U.S. Government is the largest single employer of scientists and engineers in this country. It employs about 50,000 professional engineers and 26,000 physical and related scientists, or about 6 and 8 percent, respectively, of the Nation's total supply of trained personnel in these occupations.

The U.S. Government has been fairly successful in attracting and holding adequate numbers of competent engineers and scientists. However, at times it has been difficult to meet its manpower requirements due to shortages of trained people in these categories. Within a free economy, imbalance in the demand-supply situation of any commodity tends to bid up the price, and this has been true with regard to scientifically trained personnel. In the private sector of the economy there are no limitations preventing a business from quickly adjusting its salary rates to the prevailing market price. Salaries in the Federal Government, on the other hand, can be adjusted only by legislative action—a process which does not lend itself to rapid or frequent adjustment.

Special legislation has provided special pay levels for a limited number of higher grade scientists and has authorized the Civil Service Commission to recruit for certain critical occupations, including engineers and geologists, at above the normal minimum rates prescribed by the Classification Act.

A major difference between the situations of the American scientist and his Russian counterpart is that whereas the former is free to choose his place of employment and, in addition, the very type of his work in government, industry, or education, the latter is assigned his job by "higher authority" and has little or no opportunity to change it.

Employment by the U.S. Government in the areas of science and engineering offers unique and challenging opportunities which exist nowhere else. There are, for example, opportunities to carry out fundamental research without the necessity of compromising the work

for the sake of speed or profit. There is freedom to discover basic facts and publish them without pressure to protect the employer's competitive position. And there is the challenge of providing a public service by coping with man's environment so that human life may be sustained and enriched.

The compensation of U.S. Government scientists, within the upper-grade levels of the Civil Service, places them within the upper 2 percent of the American wage-earning public.

PRAVDA, NOV. 2, 1958

MINERAL SELF-SUFFICIENCY OF THE GREAT POWERS & BLOCS-1955
National Requirements
PERCENT
from imports
from domestic production
PETROLEUM
COAL
STEEL
IRON ORES
MANGANESE
CHROMITE
TUNGSTEN
NICKEL
COPPER
LEAD
ZINC
TIN
ALUMINIUM ORES
SULFUR & PYRITES
PHOSPHATE ROCK
POTASH
INDUSTRIAL DIAMONDS
UNITED STATES
U.S.S.R.
UNITED KINGDOM
WEST GERMANY
FRANCE
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WESTERN HEMISPHERE
SINO SOVIET
FREE EUROPE
BRITISH COMMONWEALTH
COUNTRIES
BLOCS